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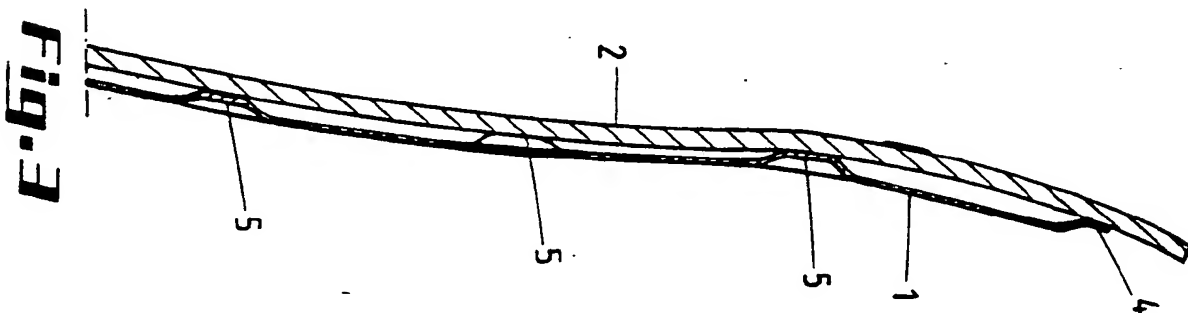
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(54) **Industrial ironing machine and method for manufacturing a bed to be used in such an ironing machine.**

(57) The invention relates to an industrial ironing machine comprising an ironing cylinder and a bed extending substantially around half of this ironing cylinder, characterized in that the bed of the industrial ironing machine is composed of flexible stainless steel plates (1, 2) having besides a laser weld (4) along the circumference a series of welded spots (5) obtained by the laser technique.



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The present invention relates to an industrial ironing machine comprising an ironing cylinder and a bed extending substantially around half of this ironing cylinder.

In industrial ironing machines of the described type, the ironing cylinder is surrounded over substantially half of its circumference, in certain cases over two-thirds thereof, by a bed which is usually heated upto the required temperature by steam for drying and ironing the goods introduced between this bed and the ironing cylinder.

The beds of such ironing machines are always composed of a heavy steel plate which has to fit closely to the ironing cylinder. In order to allow this, the inner wall of the half-cylindrically shaped bed has to be milled and finished with the utmost care.

Beds manufactured in this way have to be milled and finished carefully due to the stresses caused by the welding process so as to guarantee the required extremely smooth finishing of the inner wall of the bed.

In the French patent No. 1,235,155 these drawbacks are already indicated and proposes therefore to realize a bed designated as light, an essential characteristic of which being the indeformability of this component.

The object thereof is clearly to realize a saving of weight. Due to the still relatively large thickness of the beds manufactured according to this patent and the applied conventional welding technique, the inner wall of these beds has to be subjected to the hereabove mentioned milling operations.

An object of the invention is now to design an industrial ironing machine, the bed of which offers at least the following advantages distinguishing this component of the ironing machine clearly from that according to said French patent:

1. Large flexibility or deformability, which means that the bed adapts itself continuously to the ironing roller and to its clothing which is subjected to wear.
2. No finishing process of the inner wall is required.
3. A maximally performed weight reduction so that the components responsible for maintaining the necessary pressure between ironing roller and bed are less loaded.

In order to enable this according to the invention, the bed of the industrial ironing machine is composed of flexible stainless steel plates having a laser weld along the circumference and a series of welded spots so that both plates are connected to one another along their edges and locally, and both the weld and the welded spots are obtained by laser welding.

Still according to the invention, the plate which engages in the operative position the ironing cylinder, has a thickness of between 3 and 5 mm, while the plate which is situated in the operative position on the

outer side, has a thickness of between 0.80 and 1.20 mm.

As explained in the preamble, the invention also relates to the method for manufacturing a bed to be used in combination with the ironing cylinder of an industrial ironing machine according to the invention. This method is mainly characterized in that these plates are joined along their circumference by a weld obtained through the laser technique and are further mutually connected by welded spots, which welded spots are also obtained by the laser technique, and finally the plate of the smallest thickness is deformed by injection of water under pressure until a spacing of about 2 mm is realized between both plates.

Other details and advantages of the invention will become apparent from the following description of an industrial ironing machine and the method for manufacturing a bed for use in such an ironing machine according to the invention. This description is only given by way of example and does not limit the scope of the invention. The reference numerals relate to the annexed figures.

Figure 1 is a schematically shown side elevation-al view of the ironing cylinder together with the bed pertaining thereto and means for keeping the bed pressed against the ironing cylinder.

Figure 2 shows schematically a possible distribution of the welded spots between both plates pertaining to the bed according to the invention.

Figure 3 is a cross-section according to line III-III of Figure 2.

The bed shown by the different figures is a bed pertaining to an ironing machine, the ironing cylinder of which has a large diameter. By large diameter, there is meant a diameter comprised between about 600 and 1600 mm. The problem with such large ironing cylinders consists in obtaining a closely fitting of the bed around the ironing roller. A closely fitting of these two components is a clear requisite for obtaining a remaining correct functioning of the machine. During its functioning, the clothing of the ironing roller is subject to wear. This wear, especially when it is locally more pronounced for one reason or another, is the origin of serious difficulties. Such problems regularly arise with beds having a high rigidity and a lack of deformability.

The hereabove described drawbacks of beds used in ironing machines of large diameters can now be obviated by designing a bed which is formed by connecting two thin plates. By thin plates there are meant plates having a thickness of about 1 mm for the plate 1 which is situated in the operative position on the outer side of the bed, and a thickness of about 4 mm of the plate 2 which, also considered in the operative position, engages the ironing roller 3.

The method for manufacturing the bed according to the invention consists in superimposing the plates 1 and 2 in a flat position and connecting them to one

another by a laser weld 4 along the circumference and connecting them further locally to one another also by making use of a laser beam and this according to an arbitrary pattern. Figures 2 and 3 show a series of such welded spots 5.

After having applied the different welded spots 5 by making use of the laser beam, a pressure is built up to about 30 bars by injection of pressurized water between the plates 1 and 2, so that the thinner plate 1 will deform whereas the plate 2 maintains its continuous cross-profile. Between the different welded spots 5, flow channels for the circulating fluid, usually steam, are formed. The distance between the plates 1 and 2 comprises about 2 mm and composes the actual steam chamber. The plates 1 and 2 connected to one another in this way constitute a flexible entity which can be raised and be maintained in a position wherein they are pushed against the outer wall of the ironing cylinder by hydraulic jacks 6 (Figure 1).

Due to the flexibility of the plates composing the bed, this bed will closely fit against the ironing cylinder itself on the inner side, i.e. on the side of the plate 2, and this notwithstanding deformation or wear of the clothing of the ironing roller.

The advantages of the bed described within the scope of this invention can be summarized as follows:

- a) the construction of the bed is simple and cheap due to the complete omission of the technically complicated operations for milling a bed consisting of a heavy, or in anyway considerably more heavy plate than represented here,
- b) due to the connection of the thin and flexible plates through the laser beam technique, deformations of the outer surface of the plate 2 are avoided, which plate remains in operation always nicely in contact with the ironing cylinder 3 and this, as already emphasized hereinabove, notwithstanding possible wear or local deformations of this component. Connecting plates having a thickness in the range of 7 to 15 mm by spot welding generates stresses and therefore deformations which require expensive and time consuming milling operations. This is a very remarkable advantage since the milling operations can be omitted entirely.
- c) The efficiency of the bed according to the invention can therefore be considered as being very high and reliable due to the remaining and perfect fitting of the bed against the ironing roller;
- d) the heat transfer through a stainless steel plate having a thickness of about 4 mm is considerably better than through a steel plate of a conventional bed having a thickness of about 15 mm;
- e) due to the very small steam content, the circulation of the hot steam does not raise the problems which are proper to wider steam chambers.

From the hereabove given description of the ironing machine according to the invention and of the method for manufacturing the bed thereof, it appears that a flexible deformable bed which adjusts itself always to the ironing roller can be manufactured by making use of steel plates which may be considered in the relevant field as having a very small thickness. Also the welding technique suggested for this application has for result that every after treatment of the flexible bed becomes superfluous.

The invention is not limited to the hereabove described embodiment and many modifications could be applied thereto without leaving the scope of the patent application.

Claims

1. An industrial ironing machine comprising an ironing cylinder and a bed extending substantially around half of this ironing cylinder, characterized in that the bed of the industrial ironing machine is composed of flexible stainless steel plates (1, 2) having besides a laser weld (4) along the circumference a series of welded spots (5) obtained by the laser technique.
2. An industrial ironing machine according to claim 1, characterized in that said plate (2), which engages in the operative position the ironing cylinder (3), has a thickness of between 3 and 5 mm.
3. An industrial ironing machine according to claims 1 and 2, characterized in that said plate (1), which is situated in the operative position on the outer side, has a thickness of between 0.80 and 1.20 mm.
4. A method for manufacturing a bed to be used in combination with the ironing cylinder of an industrial ironing machine, which bed is composed of two stainless steel plates having a thickness of between 0.80 and 1.20 mm, on the one hand, and between 3 and 5 mm respectively, on the other hand, characterized in that these plates (1, 2) are joined along their circumference by a laser weld (4) and are further mutually connected by welded spots (5), which welded spots are also obtained by the laser technique, and finally the plate (1) of the smallest thickness is deformed by injection of water under pressure until a spacing of about 2 mm is realized between both plates.
5. A method according to claim 4, characterized in that pressurized water is injected between both plates (1, 2) until a pressure of about 30 bars is built up.

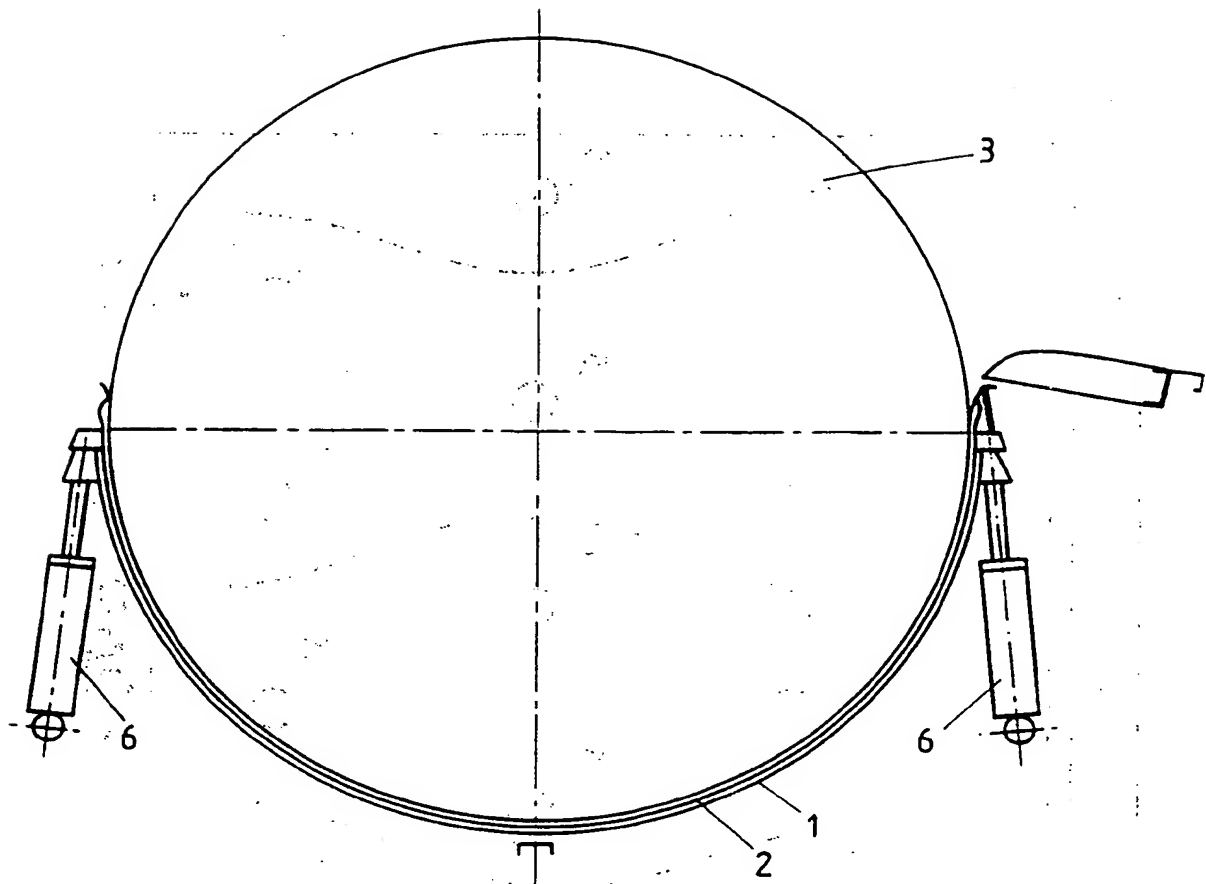
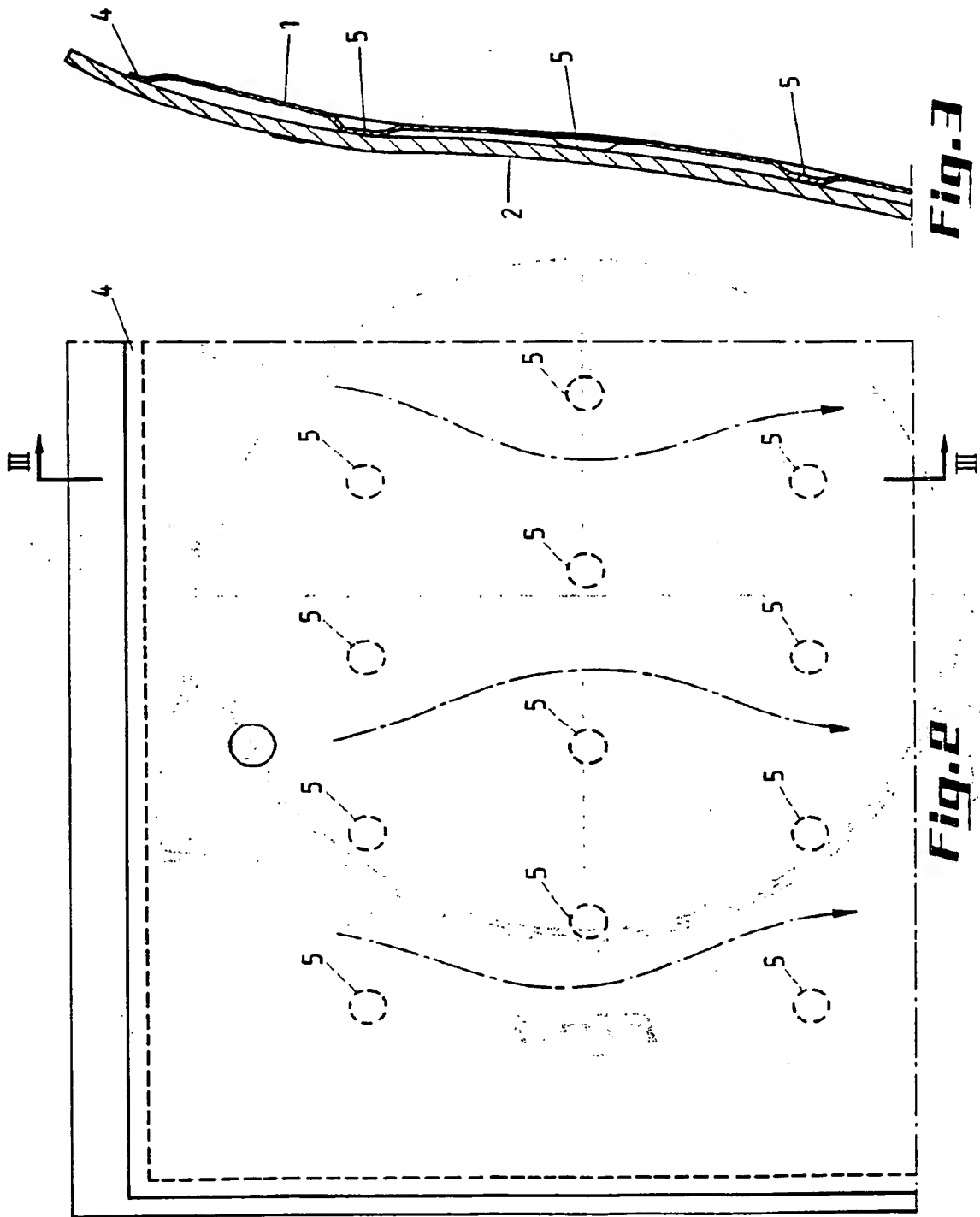


Fig.1





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 93 87 0095

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,D A	FR-A-1 235 155 (ATELIERS DE CONSTRUCTION EMILE DIHOOGHE S.P.R.L.) * page 2, column 1, line 56 - page 3, column 1, line 9; figures 3,4 *	1 2,3	D06F67/08
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			D06F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13 SEPTEMBER 1993	Examiner COURRIER G.L.A.
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